

Please substitute the following for material located on page 14, lines 14-19:

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The present invention provides other two-dimensional grid designs and methods of moving the grid such that the x-ray image will have no overexposed strips at the intersection of the grid walls A and B. The principle is based on adding additional cross-sectional areas to the grid to adjust for the increase of the primary radiation caused by the overlapping of the grid walls. These additional cross-sectional areas added to the grid, as described in this paragraph and herein, may be referred to as "projections." This grid design and construction provides uniform x-ray exposure.

REMARKS

Reconsideration and allowance of the above identified application are respectfully requested. Upon entry of this amendment, claims 1-TBD will be pending in the application.

In the Office Action, claims 1-30 and 37-45 have been rejected under 35 U.S.C. §112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. Claims 1-30 and 37-45 have been rejected under 35 U.S.C. §103 as being unpatentable in view of U.S. Patent No. 5,263,075 to McGann et. al (the "McGann" patent). Also, claims 31-36 have been rejected under 35 U.S.C. §103 as being unpatentable in view of U.S. Patent No. 5,418,833 to Logan (the "Logan" patent). Applicant respectfully traverses all these rejections, and submits the following for consideration by the Examiner.

The claimed embodiments of the present invention will now be described in more detail.

The embodiment of the present invention as recited in independent claims 1, 27, 31, 37 and 43 provides a grid that is adaptable for use with an electromagnetic energy admitting device, and comprises at least one metal layer. The metal layer includes top and bottom surfaces, and a plurality of integrated intersecting walls that extend from the top and bottom surface and are arranged to define a plurality of openings extending entirely through the layer. As specifically recited in claim 1, at least one of the openings includes at least one projection extended therein. As specifically recited in claim 27, the method for minimizing scattering of electromagnetic energy in an electromagnetic imaging device includes moving the grid in a grid moving pattern while said electromagnetic energy emitting source is emitting energy toward said imager. As specifically recited in claim 31, the method for minimizing scattering of electromagnetic energy

in an electromagnetic imaging device includes placing a grid that comprises openings having a non-square shape at said top surface between an electromagnetic energy emitting source of the electromagnetic imaging device and said imager. As specifically recited in claim 37, the method for making the grid includes the step of applying a resist coating onto a substrate surface. As specifically recited in claim 43, at least one of the openings is non-square shaped, and the openings are arranged in a periodic pattern.

As discussed below, Applicant submits that all the pending claims are definite and allowable, especially in that the term projection is explained in the summary of the invention, the abstract of the invention, and the body of the specification as amended. Also, both Logan and McGann fail to teach grid openings with projections, and Logan fails to teach use of a metal grid that is the same or similar to that of the Applicant's. The rejection will now be discussed in more detail.

The 35 U.S.C. §112 Second Paragraph Rejection

Applicant respectfully submits that claims 1-30 and 37-45 are definite and indeed particularly point out and distinctly claim the subject matter of the invention. The Examiner has alleged that the claim feature "projection" is unclear, and further that "[t]he disclosure does not describe projections but rather a thickening of the walls at [the] [sic] intersection." The Applicant respectfully submits that the meaning of the claim feature "projection" is not unclear and is fully supported in the specification.

The Examiner will note that "[i]t is well established that claims are not read in a vacuum, and limitations herein are to be interpreted in light of the specification in giving them their broadest reasonable interpretation." *In re Marosi*, 218 USP 289, 292 (Fed. Cir. 1983), *In re Snead & Young*, 218 USPQ 385, 3888 (Fed. Cir. 1983). Furthermore, "[i]n determining the meaning of patent claims, words in a claim will be given their ordinary and accustomed meaning unless it appears that the inventor used them differently." *Jonsson v. The Stanley Works*, 14 USPQ2d 1863, 1870 (Fed. Cir. 1990). Therefore, the Applicant refers the Examiner to the specification and common usage of the claim feature word "projection" to provide that the claim feature is definite and is disclosed in the specification.

In the Summary of the Invention, the specification discusses the aforementioned projections: "[A]t least some of the side surfaces have *projections extending into respective ones of the openings*. The *projections can be of various shapes and sizes*, and are arranged so that a

total amount of wall material intersected by a line propagating in a direction, for example, along an edge of the grid, for each period along the grid is substantially the same and is also substantially the same as another total amount of wall material intersected by another line for each period propagating in another direction substantially parallel to the edge of the grid at any distance from the edge.” Specification, page 4, line 25, through page 5, line 3 (emphasis added).

The term projections reads on the discussion of the detailed description, and in particular the phrases “adding additional cross-section areas to the grid” and “when square pieces in the shape of the septa are added to the grid” as found on page 14; “add additional grid area at each corner” and “[t]he general rule is that the overlapping grid region C formed by grid walls A and B has to be “added back” to the grid intersecting region” as found on page 15; and as shown in Figs. 7, 8, 10, and 12-16. The specification is being amended to refer to these projections: “The principle is based on adding additional cross-sectional areas to the grid to adjust for the increase of the primary radiation caused by the overlapping of the grid walls. *These additional cross-sectional areas added to the grid, as described in this paragraph and herein, may be referred to as ‘projections’.*” Specification, page 14 (emphasis added).

Referring to Figs. 8 and 10, it is clear to see that the “added back” portion mentioned above are projections formed in the metal plate that makes up the grid array. In the first instance of Fig. 10, the projections are squares, and in the second instance of Fig. 12, the projections are triangles. Further, Figs. 12-16 show the “added back” projections of other examples. This is discussed in detail in the specification on page 16, lines 19-25.

In the Abstract of the Invention, the term “projection is also used: “The side surfaces of the solid integrated walls are arranged to define a plurality of openings extending entirely through the layer. At least some of the walls *also can include projections extending into the respective openings formed by the walls. The projections can be of various shapes and sizes, and are arranged* so that a total amount of wall material intersected by a line propagating in a direction along an edge of the grid is substantially the same as another total amount of wall material intersected by another line propagating in another direction substantially parallel to the edge of the grid at any distance from the edge.” Specification, page 38, lines 6-13 (emphasis added).

Therefore, because the claims are read in light of the portions of the specification described above, it is respectfully submitted that the Examiner’s rejection of claims 1-30 and 37-45 under 35 U.S.C. §112, 2nd paragraph is in error, and Applicant respectfully requests the Examiner to withdraw said rejection.

The 35 U.S.C. §103 Rejections Based on McGann

Applicant respectfully submits that claims 1-30 and 37-45 are not rendered unpatentable under 35 U.S.C. §103 in view of McGann, in that McGann fails to teach or disclose all the claim features, including a grid comprising at least one metal layer as specifically recited in independent claims 1 and 43. Furthermore, the McGann patent fails to teach that the metal layer has at least one projection extending into at least one of its openings as recited in independent claim 1. Applicant further submits that McGann fails to teach or disclose all the steps of independent claim 27 including placing a grid between an electromagnetic energy emitting source, with the grid comprising (among other items) at least one metal layer, a plurality of solid integrated intersecting walls, having a plurality of side surfaces being arranged to define a plurality of openings, with at least one of the openings including at least one projection extending therein. Additionally, McGann fails to teach or disclose the steps of making a grid according to independent claim 37 including, at least, the steps of applying a resist coating onto a substrate structure, and introducing material into the openings in the remaining portion of the resist material such that the resist material forms the intersecting walls of the at least one layer of the grid with at least one projection extending into the at least one of the openings in the grid.

As discussed above, the McGann patent does not teach or suggest a grid comprising at least one metal layer. Rather, as described, for example, beginning in column 5, line 4 of the McGann patent, the McGann device employs a collimator that includes leaded glass micro-channel plate (MCP) detectors 36. Applicant submits that a leaded glass micro-channel plate is completely unlike a grid including at least one metal layer. For example, in a leaded glass MCP, it is difficult to make a precise pattern of openings at precise locations in the grid. The etching method described in the McGann patent tends to produce unevenly spaced openings of different sizes.

Furthermore, as described in column 5, lines 39-45 of the McGann patent, the individual MCPs are stacked and aligned so that the holes of the adjustment plates *are in exact registration*. Lines 34-45 of column 5 further emphasize that "without proper registration, the collimator will essentially be closed to the passage of x-rays." Applicant respectfully submits, therefore, that the McGann patent teaches away from any projection in the openings as recited in claim 1, and requires that the openings be free of any obstruction. Also, although claim 43 does not recite a

projection in any of the openings, as stated above, the MCP 36 of the McGann device is not a metal layer, but rather is made of leaded glass.

In addition, McGann does not teach or disclose a method of making a grid that includes the features of claim 37 which include applying a resist coating onto a substrate structure. Instead, McGann discloses a method of manufacturing the high angular resolution collimator that “requires the uses of lead glass micro-channel plate (MCP) detectors” (McGann, col. 5, lines 5-6), which are made up of many bundled channels of optical fibers fused and sliced at their cross section to form a solid core. This is completely unlike the method claimed in claim 37 which discloses use of a substrate structure. Further, even though McGann does disclose the step of etching, McGann does not disclose the step of “introducing material into the openings in the remaining portion of the resist such that the material forms the intersecting walls of the at least one layer of the grid, with at least one projection extending into at least one of said openings in the grid.”

For all of the above reasons, Applicant submits that claims 1-30 and 37-45 are not rendered unpatentable under 35 U.S.C. §103 in view of McGann, and the Examiner is respectfully urged to withdraw said rejection of the aforementioned claims.

The 35 U.S.C. §103 Rejections Based on Logan

Applicant respectfully submits that claims 31-36 are not rendered unpatentable under 35 U.S.C. §103 in view of Logan in that Logan fails to teach or disclose all the claimed features, including placing a grid, comprising at least one metal layer, between an electromagnetic energy emitting source of the electromagnetic imaging device and said imager, as specifically recited in independent claim 31.

Logan describes an x-ray anti-scatter grid for x-ray imaging, particularly for screening mammography, and a method for fabricating the same. The grid of Logan requires that x-rays incident along a direct path pass through a grid composed of a plurality of parallel or crossed openings, microchannels, grooves, or slots *etched in a substrate, such as silicon, having the walls of the microchannels or slots coated with a high opacity material*, such as gold, while x-rays incident at angles with respect to the slots of the grid, arising from scatter, are blocked.

Logan does not teach or suggest the use of a grid comprised of “*at least one metal layer including top and bottom surfaces . . .*” Instead, Logan teaches that the “[t]he present invention utilizes, for example, anisotropic etching methods to produce deep, narrow slots, openings,

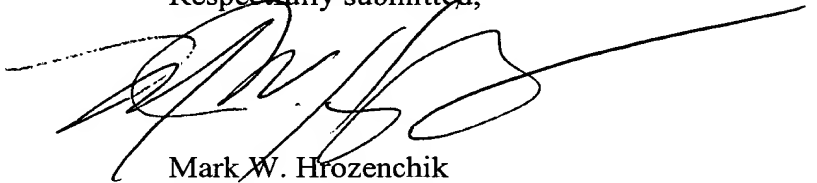
grooves, or microchannels in a *grid substrate, such as a silicon (Si) wafer.*" Logan, Col., 4, lines 49-52 (emphasis added). Furthermore, Logan describes the manufacture of the grid in detail, but only describes such a process utilizing a silicon wafer. See, for example, column 5, lines 11-17; column 5, lines 39-41; column 5, lines 55-58 and column 6, lines 8-14.

In Logan, the walls of the etched grid are merely "coated with a material of high x-ray opacity (material with a high density and atomic number), such as gold (Au)." Logan, col. 4, lines 65-67. In Logan, the walls are not a solid integrated intersecting wall comprised of metal is described in claim 31. This is far different from the grid claimed in claim 31, which is a grid comprised of "at least *one metal layer including top and bottom surfaces and a plurality of solid integrated, intersecting walls*, each of which extend from said top to bottom surface and having a plurality of side surfaces . . ."

For all of the above reasons, Applicant submits that claims 31-37 are not rendered unpatentable under 35 U.S.C. §103 in view of Logan, and the Examiner is respectfully urged to withdraw said rejection of the aforementioned claims.

Examiner is directed to the new claims that have been added with this response. It is respectfully asserted that these additional new claims are also not anticipated by Logan and McGann, nor can be considered obvious in view of either Logan and McGann, and favorable consideration of their patentability is hereby requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Mark W. Hrozenchik', with a long horizontal line extending to the right.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

SPECIFICATION

Page 14, lines 14-19:

The present invention provides other two-dimensional grid designs and methods of moving the grid such that the x-ray image will have no overexposed strips at the intersection of the grid walls A and B. The principle is based on adding additional cross-sectional areas to the grid to adjust for the increase of the primary radiation caused by the overlapping of the grid walls.

These additional cross sectional areas added to the grid, as described in this paragraph and herein, may be referred to as "projections." This grid design and construction provides uniform x-ray exposure.

Page 27, lines 4-9:

3. Framed Construction: Instead of using pegs and fixed posts, a thick and wide frame can be [sued] used for assembly and packaging. Fig. 29 is a side view of the grid showing frame 400. The bottom layer 401 of the grid has extra material at corners of the intersections of its walls as shown, for example, in Figs. 8, 10 and 17, to provide uniform exposure during grid motion, and the other grid layers 402 do not have extra material at the corners of their wall intersections.